

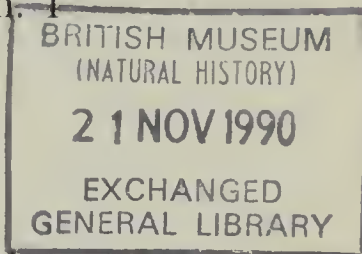
Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano

Vol. 131 (1990), n. 9, pag. 197-204

Milano, giugno 1990

Studies on Permo-Trias of Madagascar - n. 1

Paolo Arduini (*)



Thylacocephala from Lower Trias of Madagascar

Abstract — We hereby describe *Ankitokazocaris acutirostris* n.g. n.sp. and *Ostenocaris ambatolobensis* n.sp., new thylacocephalan crustaceans from Lower Triassic, found near Ankitokazo, in the Ambilobè region (North-Western Madagascar). It is the first description of the class Thylacocephala in Gondwana's Mesozoic. The area known as «Couches d'Ankitokazo» has been known since the beginning of this century because of its rich fish fauna — repeatedly studied by several French authors — and of *Antrimpos madagascariensis*, published by Van Straelen, which was until recently considered the oldest known decapod.

Résumé — Thylacocephala du Trias inférieur du Madagascar. On décrit *Ankitokazocaris acutirostris*, n.g. n.sp. et *Ostenocaris ambatolobensis* n.sp. des crustacés thylacocéphales du Trias inférieur, trouvés près de Ankitokazo dans la région de Ambilobè (Nord Ouest du Madagascar). Il s'agit de la première description de la classe Thylacocephala du Mésozoïque du Gondwana. Les Couches d'Ankitokazo, d'où provient les nouvelles espèces, est connue depuis le début du siècle grâce à la riche faune de poissons, à plusieurs reprises étudiée par divers spécialistes français, et à l'*Antrimpos madagascariensis*, publié par Van Straelen, qui il n'y a pas trop longtemps était considéré le plus ancien décapode connu.

Riassunto — Thylacocephala del Trias inferiore del Madagascar. Vengono descritti *Ankitokazocaris acutirostris* n.g. n.sp. e *Ostenocaris ambatolobensis* n.sp., nuovi crostacei tilacocefali del Triassico inferiore, rinvenuti nei pressi di Ankitokazo nella Regione di Ambilobè (Madagascar Nord Occidentale). Si tratta della prima segnalazione della classe Thylacocephala nel Mesozoico

(*) Museo Civico di Storia Naturale di Milano.

del Gondwana. I «Couches d'Ankitokazo», dai quali le nuove specie provengono, sono conosciuti fin dall'inizio di questo secolo per la ricca fauna a pesci studiata a più riprese da diversi autori francesi e per l'*Antrimpos madagascariensis*, pubblicato da Van Straelen, e che fino a poco tempo fa era considerato il più antico decapode conosciuto.

Key words: Thylacocephala, Trias, Gondwana, Madagascar.

Introduction

In the region of Ambilobè, about 150 km SW of Diego Suarez, (Madagascar N.W.), the marine Lower Triassic is represented by marly shales and shales, intercalated by arenaceous layers. The sandstones have no fossils, while the shales are characterized by lenticular levels with flattened ellipsoidal nodules the size of which ranges from 2-3 cm to 20 cm. These nodules contain a well known fauna with ammonites, crustaceans, fishes and amphibians. The nodules are siliceous-marly, compact, from reddish to pale brown in color, with a silicate percentage higher than 70% (Besairie, 1972); the reddish color is due to a high concentration of iron oxides. The shales have deposited in a marine basin affected by the near seashore: in fact the marine layers contain plants and amphibians (Besairie, 1972).



Fig. 1 — Map of Madagascar and region of discovery.

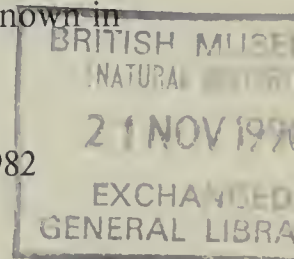
In the month of May of 1989 the Museo Civico di Storia Naturale di Milano carried out near Ankitokazo — a site located 30 km south of Ambilobè — a first field mission which brought to light a thousand specimens among fishes, ammonites, decapod and thylacocephalan crustaceans.

The fossils are preserved in the ellipsoidal nodules often as external mould as in the case of fishes. The study of the fishes was carried out by moulding specimens in rubber, in order to obtain the positive mould (Lehman, 1952). This procedure has not been utilized for the study of our thylacocephala specimens, as they are always flattened, and often present to direct observation the mould of the internal side of the carapace.

Palaeontological description

We examined a total of 29 specimens, 28 of which are ascribed to the new genus *Ankitokazocaris* and one, complete of part and counterpart, is ascribed to the genus *Ostenocaris* (Arduini, Pinna & Teruzzi, 1984) already known in the Jurassic of Northern Italy.

Class Thylacocephala Pinna, Arduini, Pesarini & Teruzzi, 1982
 Order uncertain ⁽¹⁾
 Genus *Ankitokazocaris* nov.



Derivatio nominis: from Ankitokazo, a small village in the Ifasy Valley near the fossiliferous exposure in which all specimens were found.
 Geological age: Lower Trias (Scythian).
 Description: corresponding to that of the type species.

Ankitokazocaris acutirostris n. sp.

Derivatio nominis: from the distinctive sharp rostrum.
 Holotype: n. cat. MSNM/i 10836, Collection of the Museo Civico di Storia Naturale di Milano.
 Paratypes: n. cat. MSNM/i 11038 - MNSM/i 11064, Collection of the Museo Civico di Storia Naturale di Milano.
 Type locality: Ambatolokobè, near Ankitokazo, Ambilobè Region (Madagascar N.W.).

Diagnosis: dorsal margin convex, rectilinear in the anterior third; rostrum strong. Anterior margin concave on the upper third.

⁽¹⁾ Rolfe (1985) proposes two orders for the class Thylacocephala: the order Concavicularida, gathering the Paleozoic forms and the order Conchyliocarida, gathering the non-concavicularid forms like *Ostenocaris* and *Dollocaris*. The subdivision proposed by Rolfe does not take into account particular forms, like *Austriocaris carinata* Glaessner 1931 and *Ankitokazocaris acutirostris* n. sp., which show features of passage between the two orders. Therefore the order is indeterminate for the mentioned forms.

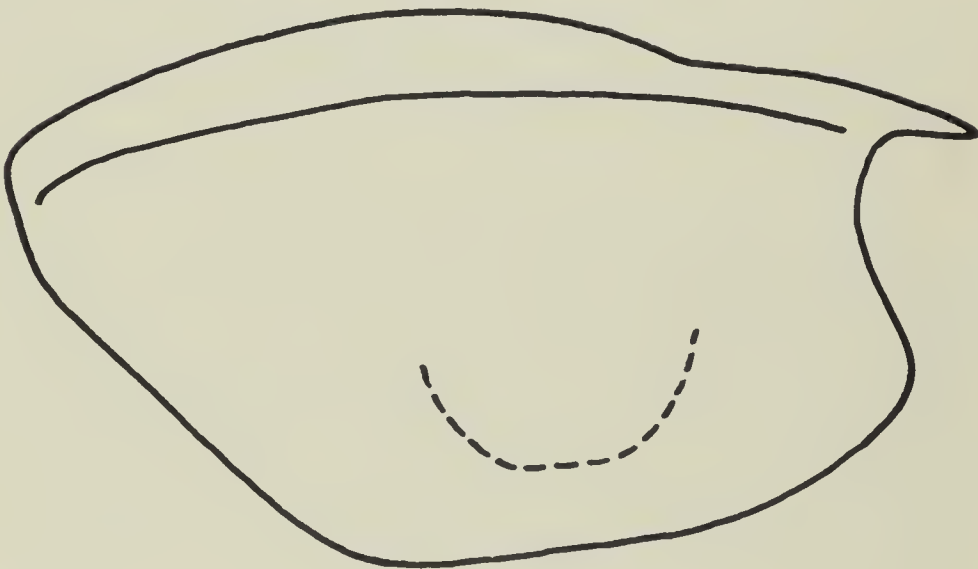


Fig. 2 — *Ankitokazocaris acutirostris*, holotype - n. cat. MSNM/i 10836, Collection of the Museo Civico di Storia Naturale di Milano, photo and reconstruction. ($\times 1.4$)

Description: univalve carapace subrectangular in lateral view. The anterior margin is clearly concave. The dorsal margin is slightly convex in the posterior two thirds, describes a flexus at one third of its length and becomes straight anteriorly. The dorsal margin is extended in a strong, straight, triangular shaped rostrum. A lateral carina comes off the base of the rostrum

and runs longitudinally through the whole carapace. The front margin is connected at right angle to the anterior third of the ventral margin. The anterior third of the ventral margin is short and straight and connected to the posterior part — which is almost rectilinear — through a slight bending. The ventral margin is connected with the posterior margin, which is short and slightly convex tract, bent at a wide angle of 132° . In the ventral region the carapace shows a not very clear semicircular impression, similar to an analogous structure that can be found on the carapace of the representative of the genus *Ostenocaris* Arduini, Pinna & Teruzzi, 1984, which is interpreted as a carina for the attachment of the muscles of cephalic appendages (Alessandrello et al., 1990 in press); this structure corresponds to that previously interpreted as the impression of an adductor muscle (Arduini et al., 1980).

Along the anterior part of the ventral margin it is possible to observe a few structures that cannot be identified with absolute certainty; they could be interpreted as the residues of the cephalic appendages. In the specimen MSNM/i 11040 it is possible to observe the typical structures, already noted in *Ostenocaris*, of the cephalic sac, such as the surface with an hexagonal arrangement and the muscular complex.

Observations: the general shape of the carapace of the new species is different from that of all the other known Thylacocephala. It is possible to notice a slight morphological affinity with the species *Concavicaris sinuata* (Meek & Worthen, 1868) from the Coal Measures of Illinois (see Briggs & Rolfe 1983, text-fig. 6d): in both species the front margin of the carapace shows a clearly marked concavity.

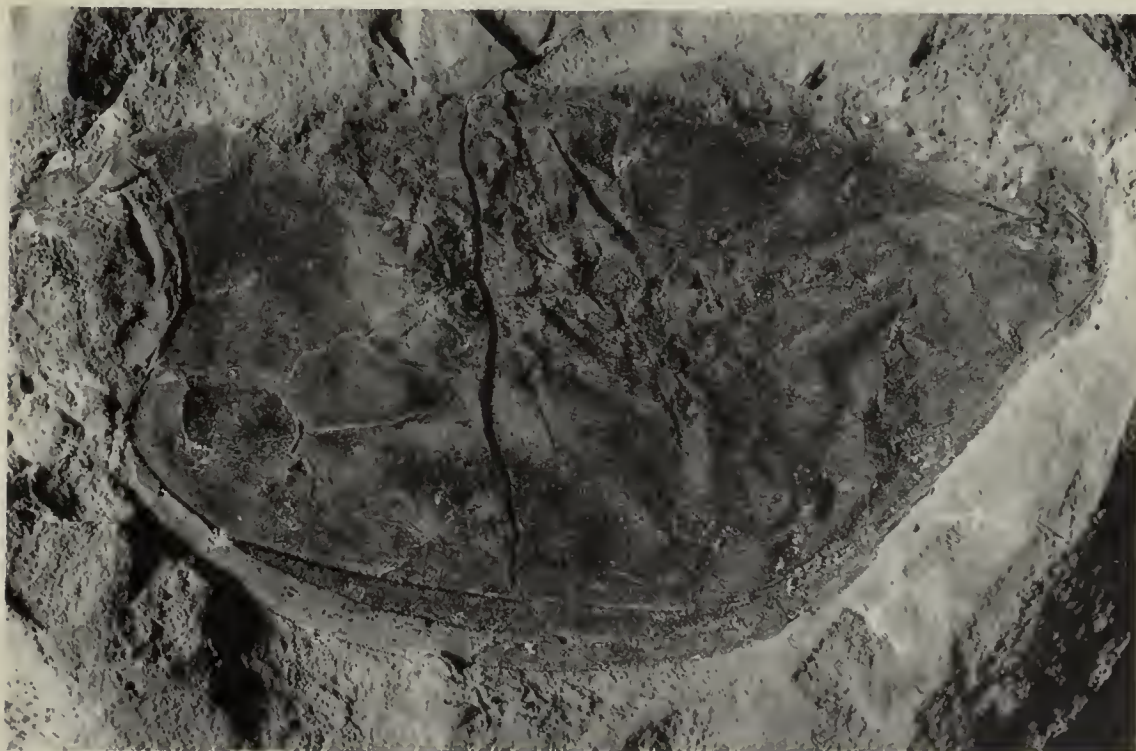


Fig. 3 — *Ankitokazocaris acutirostris*, paratype - n. cat. MSNM/i 11040, Collection of the Museo Civico di Storia Naturale di Milano, specimen which conserve a portion of cephalic sac. ($\times 2.7$)

Order Conchyliocarida Secretan, 1983 (sensu Rolfe 1985)

Genus *Ostenocaris* Arduini, Pinna & Teruzzi, 1984

Ostenocaris ambatolokobensis n. sp.

Derivatio nominis: from Ambatolokobè, type locality.

Holotype: specimen MSNM/i 11037, Collection of the Museo Civico di Storia Naturale di Milano.

Type locality: Ambatolokobè, a hillock near Ankitokazo, Ambilobè Region (Madagascar N.W.).

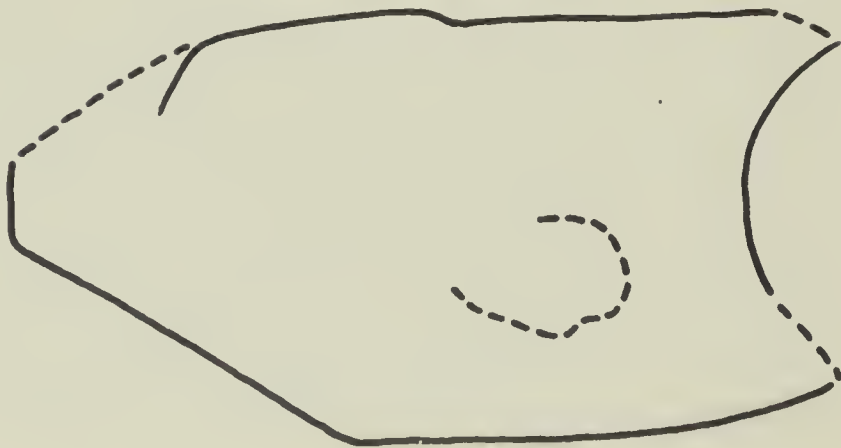
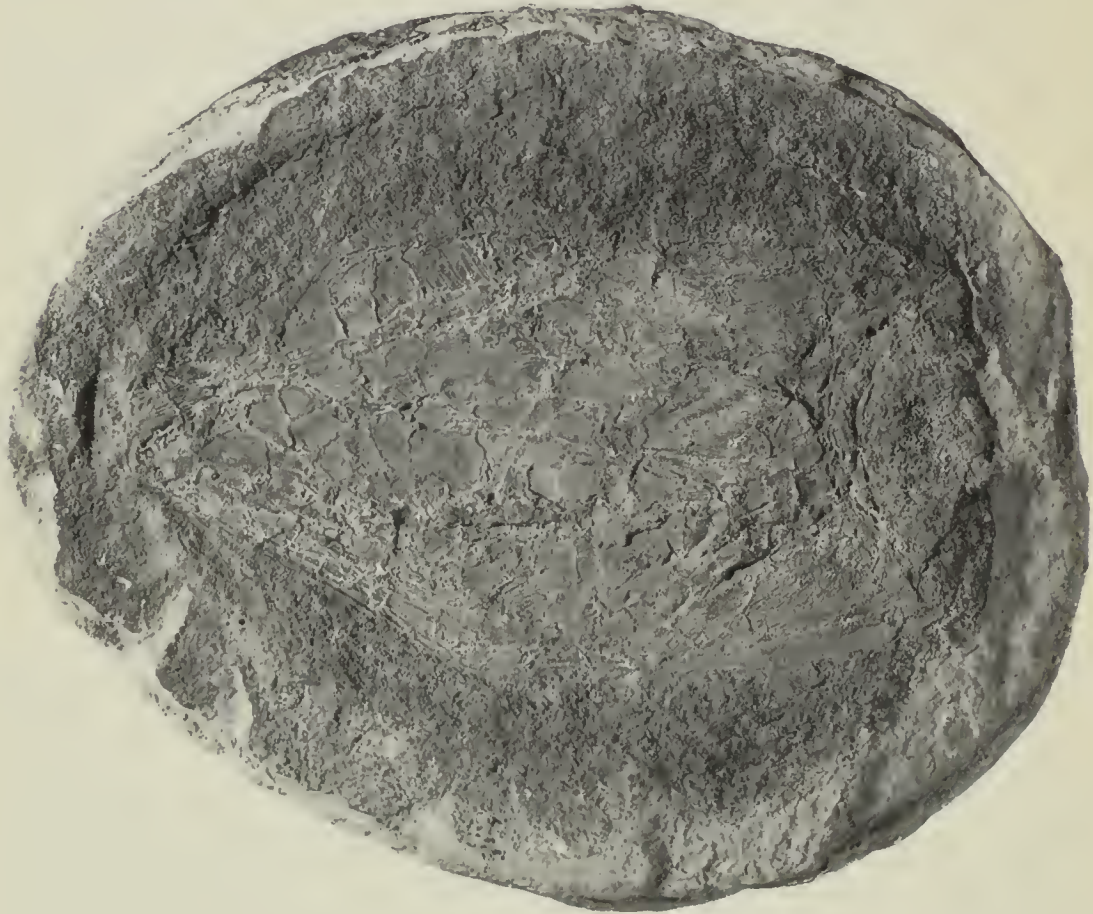


Fig. 4 — *Ostencaris ambatolokobensis*, holotype, n. cat. MSNM/i 11037, Collection of the Museo Civico di Storia Naturale di Milano, photo and reconstruction. ($\times 1.7$)

Diagnosis: dorsal margin rectilinear; rostrum absent; anterior margin wide, concave. Posterior margin short and straight.

Description: univalve, subrectangular carapace. The dorsal margin is almost rectilinear with a flexus in its median part; it is not markedly convex and joins to the ventral margin with a wide, very rounded angle; the ventral margin is subparallel to the dorsal one in its first two thirds, and bents clearly upward in the last tract. The posterior margin is short and straight. The carapace is smooth, devoided of ornamentation and carinae; on the lower part of the anterior third is clearly visible a reniform impression corresponding to the attachment area of the muscles of the appendages.

The internal side of the carapace shows a finely grooved structure unknown in thylacocephalans studied until now.

Observations: the new species is very similar to the smaller forms of osteno-carids from the Lower Jurassic of Osteno, which are currently ascribed to the same species *O. cypriformis* as the larger forms of the same gisement. Both forms show a reduced rostrum, a dorsal margin with a median flexus, a front margin moderately concave. The new species differs from the forms of Osteno because of the abdominal tract of the ventral margin, which is much shorter and straight, and not concave as in Jurassic forms. Beyond the already mentioned similarities with osteno-carids, the new form shows a further similarity with *Ostenocaris* in having an identical angle between the ventral and the posterior margin (147°).

Conclusions. The new forms of Thylacocephala are the first ones to be recorded in the Mesozoic of Gondwana. Until present, only concavocarids from the Devonian of Australia were described from the southern hemisphere.

Acknowledgements — I want to acknowledge, for their valuable help in obtaining the materials, the Direction des Mines et de la Géologie of Antananarivo, the firm SOCOMAF of Antananarivo and Mr. Giovanni Pasini.

Bibliografia

- Alessandrello A., Arduini P., Pinna G. & Teruzzi G., 1990 - New observations on the Thylacocephala (Arthropod, Crustacea). In Simonetta A. M. & Conway Morris S. - The early evolution of Metazoa and the significance of problematic taxa. (In press).
- Arduini P. & Pinna G., 1989 - I Tilacocefali: una nuova classe di crostacei fossili. *Natura*, Milano, 80 (2): 34 pp.
- Arduini P., Pinna G. & Teruzzi G., 1980 - A new and unusual Lower Jurassic cirriped from Osteno in Lombardy: *Ostenia cypriformis* n.g. n. sp. (Preliminary note). *Atti Soc. Ital. Sci. Nat. Museo Stor. Nat.*, Milano, 121: 360-370.
- Arduini P., Pinna G. & Teruzzi G., 1984 - *Ostenocaris* nom. nov. pro *Ostenia* Arduini, Pinna & Teruzzi, 1980. *Atti Soc. Ital. Sci. Nat. Museo Stor. Nat.*, Milano, 125: 48.
- Besairie H., 1972 - Géologie de Madagascar, I. Les terrains sédimentaires. *Ann. Geol. Madagascar*, Tananarive, 35: 27-32.

- Besairie H. & Collignon M., 1956 - Lexique Stratigraphique International, Afrique, Madagascar, *C.N.R.S.*, Paris, IV (11): 1-93.
- Briggs D. E. G. & Rolfe W. D. I., 1983 - New Concavicularida (New Order ?Crustacea) from the Upper Devonian of Gogo, Western Australia, and the palaeoecology and affinities of the group. *Spec. Pap. Paleont.*, 30: 249-276.
- Lehman J.-P., 1952 - Etude complémentaire des poissons de l'Eotrias de Madagascar. *Kungl. Sven. Vetensk. Handlingar*, Stockholm, 2 (6): 3-201.
- Meek F. B. & Worten A. H., 1868 - Preliminary notice of a Scorpion, a Eurypterus? and other fossils, from the Coal Measures of Illinois. *Amer. J. Sci.*, s. 2, 46: 22.
- Pinna G., Arduini P., Pesarini C. & Teruzzi G., 1982 - Thylacocephala: una nuova Classe di Crostacei fossili. *Atti Soc. Ital. Sci. Nat. Museo Stor. Nat.*, Milano, 123: 469-482.
- Rolfe W. D. I., 1985 - Form and function in Thylacocephala, Conchyliocarida and Concavicularida (? Crustacea): a problem of interpretation. *Trans. R. Soc. Edinburgh*, 76: 391-399.
- Secretan S., 1983 - Une nouvelle classe fossile dans la superclasse des Crustacés: Conchyliocarida. *C. R. Acad. Sci. Paris*, s. II, 296: 741-743.